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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/681,571	05/01/2001	Manoj Ramprasad Shah	RD-28623	6751

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GENERAL ELECTRIC COMPANY
GLOBAL RESEARCH
PATENT DOCKET RM. BLDG. K1-4A59
NISKAYUNA, NY 12309

EXAMINER
SHARON, AYAL I

ART UNIT	PAPER NUMBER
2123	

DATE MAILED: 09/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/681,571	SHAH ET AL.	
	Examiner	Art Unit	
	Ayal I. Sharon	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 June 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 May 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Introduction

1. Claims 1-18 of U.S. Application 09/681,571, originally filed on 05/01/2001 are presented for examination. New claim 18 has been added in the amendment after RCE filed on 6/21/2005.

Claim Interpretations

2. Examiner interprets the following terms according to their definitions in The IEEE Standard Dictionary of Electrical and Electronics Terms, 6th Ed. (1996), as follows:

   a. "Flange" – synonymous with "coupling flange" (IEEE, p.230, and p.415), "The disc-shaped element of a half coupling that permits attachment to a mating half coupling."

   b. "Keybar" – synonymous with "key", definition 2 – rotating machinery (IEEE, p.566), "A bar that by being recessed partly in each of two adjacent members serves to transmit a force from one to the other."

   c. "Phase Belt" - (IEEE, p.765), "A group of adjacent coils in a distributed polyphase winding of an alternating-current machine that are ordinarily connected in series to form one section of a phase winding of the machine. Usually, there are as many such phase belts per phase as there

are poles in the machine. Note: The adjacent coils of a phase belt do not necessarily occupy adjacent slots ... "

d. "Rotor" - definition 2 – rotating machinery (IEEE, p.936), "The rotating member of a machine, with shaft. Note: In a direct-current machine with stationary field poles, universal, alternating –current series, and repulsion-type motors, it is called the armature."

e. "Stator" – definition 2 – rotating machinery (IEEE, p.1044), "The portion that includes and supports the stationary active parts. The stator includes the stationary parts of the magnetic circuit and the associated winding and leads. It may, depending on the design, include a frame or shell, winding supports, ventilation circuits, coolers, and temperature detectors. A base, if provided, is not ordinarily considered to be part of the stator.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. **Claims 1-18 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.** Examiner has given the claims the broadest reasonable interpretation. Due to the extreme breadth of the current claims, Examiner has interpreted four possible embodiments that are covered by current claim language:

    a. Performing physical testing

b. Performing electromagnetic field calculations manually (by using Maxwell's equations)

c. Using electromagnetic field simulation software to perform the calculations

d. Using a combination of the above three embodiments.

The first and second embodiments are not statutory because they are not implemented in the technological arts. The third embodiment is not statutory because the claims, in their current form, do not explicitly recite the creation of a specific "concrete, useful and tangible" result from the software or computer in the claims (See MPEP §2106 and State Street, 149 F.3d at 1373, 47 USPQ2d at 1601). The fourth embodiment actually covers a multitude of combinations of the three previous embodiments. A specific combination of the first three embodiments may or may not be statutory, depending on whether the specific embodiment falls under one of the "safe harbor" provisions of 35 U.S.C. §101 that are discussed in MPEP § 2106 (IV)(B)(2)(b)(i).

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. **Claims 1-18 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way**

as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The "Wands factors" for determining lack of enablement [*In re Wands*, 858 F.2d 731, 737, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988) and MPEP §2164.01(a)] include, but are not limited to:

a. The breadth of the claims;

b. The nature of the invention;

c. The state of the prior art;

d. The level of one of ordinary skill;

e. The level of predictability in the art;

f. The amount of direction provided by the inventor;

g. The existence of working examples; and

h. The quantity of experimentation needed to make or use the invention based on the content of the disclosure.

The following is a brief discussion of the above cited factors:

a. The breadth of the claims - the current breadth of the claims covers both statutory and non-statutory methods (see the 35 U.S.C. §101 rejection);

b. The nature of the invention - the enablement in the specification consists of (paragraph 13, emphasis added):

> The determination of the electromagnetic effects may be made by simulation in a computer (not shown) or by physical testing. In embodiments wherein computer simulation is selected, **advanced analytical methods such as time stepping finite elements with rotation** permit a designer to quantitatively determine the subtle effects of relative

locations of the keybars with respect to the phase belts on keybar voltages for a given load. The designer can then choose the positioning that minimizes the keybar voltages with the result being an optimized and more reliable machine design.

c. The state of the prior art and the level of one of ordinary skill – the cited prior art (in particular the Perkins and Gieras references) provides a representation of both of these factors;

d. The level of predictability in the art – given the high level of complexity inherent in the art of electro-magnetic simulation in general, and the art of finite element electro-magnetic modeling in particular, Examiner finds that there is a very high probability that different practitioners would arrive at different solutions;

e. The amount of direction provided by the inventor – notice in the above cited section of the specification that the teaching consists of "advanced analytical methods **such as** time stepping finite elements with rotation." No equations or algorithms have been presented;

f. The existence of working examples – examiner has not found any in the originally filed specification; and

g. The quantity of experimentation needed to make or use the invention based on the content of the disclosure – Examiner finds this to be large given the lack of written description of the "advanced analytical methods **such as** time stepping finite elements with rotation" in the specification.

7. **Claims 1-18 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.** The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

According to MPEP § 2163 (I):

> The written description requirement of the Patent Act promotes the progress of the useful arts by ensuring that patentees adequately describe their inventions in their patent specifications in exchange for the right to exclude others from practicing the invention for the duration of the patent's term.

The enablement in the specification consists of (paragraph 13, emphasis added):

> The determination of the electromagnetic effects may be made by simulation in a computer (not shown) or by physical testing. In embodiments wherein computer simulation is selected, **advanced analytical methods such as time stepping finite elements with rotation** permit a designer to quantitatively determine the subtle effects of relative locations of the keybars with respect to the phase belts on keybar voltages for a given load. The designer can then choose the positioning that minimizes the keybar voltages with the result being an optimized and more reliable machine design.

Given the high level of complexity inherent in the art of finite element electro-magnetic modeling, Examiner finds that there is a very high probability that different practitioners would arrive at different solutions. The specification does not reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

8. The specification regarding the claimed invention is deficient in the areas cited above. Accordingly, the examiner has made prior art rejections based on the

limited scope of information contained in the specification for supporting the claims. The rejections are complete and specifically applied against the claims based on this limited disclosure.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. The prior art used for these rejections is as follows:

    a. Applicant's Own Admission (see Amendment filed 6/21/2005, p.6). ("**Applicant's Own Admission**").

    b. Infolytica Corporation. FastTrack Reference Manual for MagNet 52. © 1996. ("**MagNet Manual**").

    c. Durantay, L. et al. "Large Band Reduction of Magnetic Vibrations of Induction Machines with "Breaking of Impedence" Interface." Int'l Conf. of Electric Machines and Drives (IEMD '99). May 9-12, 1999. pp.475-477. ("**Durantay**").

11. The claim rejections are hereby summarized for Applicant's convenience. The detailed rejections follow.

12. Claims 1-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Own Admission in view of MagNet Manual and further in view of Durantay.

13. In response to a previous 35 U.S.C. §112 first paragraph rejection, the Applicants responded (see Amendment filed 6/21/2005, p.6):

> With respect to enablement, Applicant respectfully traverses the page 4, section 5, last half of page statement that "advanced analytical methods" and "time stepping finite elements with rotation" mean that one of ordinary skill in the art would require too much experimentation. Applicant respectfully submits that commercially available products are available and were available at the time of filing. Three commercial vendor packages include, for example, Maxwell™ simulation from Ansoft Corp. ..., Flux3D simulation software available from Magsoft ..., and MagNet simulation software available from Infolytica Corp.
>
> MagNet Manual Supports this admission. On page 1-8 it expressly teaches the construction of stator slots for an electric motor.
>
> However, MagNet Manual does not expressly teach the use of "keybars" or "phase belts", nor the measurement of "keybar voltage" or "keybar current".
>
> Durantay, on the other hand teaches (see its introduction) that (1) magnetic forces generate stator vibrations, (2) frame vibrations are the source of magnetic noise, and (3) an optimized finite-element model analysis is used to model magnetic vibrations in stator frames. While this reference does not expressly teach the use of "keybars", it does teach the vibration of the stator frame in general (e.g., the variable K_{s_f} is the stiffness of the stator-frame interface in Eq.6, on p.476). The keybars are elements in the stator frame. While this reference does not expressly teach the use of "phase belts", it does teach

"mode shape" (See Table III on p.476). In addition, it would be possible to derive "keybar voltage" and "keybar current" from the magnetic induction equation (Eq.9 on p.476).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Applicant's Own Admission with those of Durantay, because MagNet would be an appropriate tool for implementing the teachings of Durantay.

Response to Amendment

Re: Claim Rejections - 35 USC § 112

14. Applicant's arguments filed 6/21/2005 have been fully considered but they are not persuasive.

15. Applicants repeated their previously presented responses to written description rejections (See p. 8 of the amendment filed on 1/03/2005):

> With respect to enablement, Applicant respectfully traverses the page 4, section 5, last half of page statement that "advanced analytical methods" and "time stepping finite elements with rotation" mean that one of ordinary skill in the art would require too much experimentation. Applicant respectfully submits that commercially available products are available and were available at the time of filing. Three commercial vendor packages include, for example, Maxwell™ simulation from Ansoft Corp. ..., Flux3D simulation software available from Magsoft ..., and MagNet simulation software available from Infolytica Corp.
>
> Additionally, Applicant further indicated in paragraph 13 that determination can be made by physical testing itself. This would not even require such software or "undue experimentation."

Examiner finds that these attorney arguments are an attempt to introduce evidence into the record. According to MPEP § 2145 (I), argument does not replace evidence where evidence is necessary:

> Attorney argument is not evidence unless it is an admission, in which case, an examiner may use the admission in making a rejection. See MPEP § 2129 and § 2144.03 for a discussion of admissions as prior art.
>
> The arguments of counsel cannot take the place of evidence in the record. *In re Schulze*, 346 F.2d 600, 602, 145 USPQ 716, 718 (CCPA 1965); *In re Geisler*, 116 F.3d 1465, 43 USPQ2d 1362 (Fed. Cir. 1997) ("An assertion of what seems to follow from common experience is just attorney argument and not the kind of factual evidence that is required to rebut a prima facie case of obviousness."). **See MPEP § 716.01(c) for examples of attorney statements which are not evidence and which must be supported by an appropriate affidavit or declaration**.

16. In addition, the Applicant argued in the After-Final Response (repeated in the amendment filed 6/21/05, p.6):

> [W]hat was known is that, given a particular parameter and design constraints, such "advanced" tools [Maxwell™, Flux3D, MagNet] can be programmed to find optimum settings. Basically, such software tools enable a user to input the design to be validated and to receive information about the design (meaning what is the effect if X keybars are used and/or if the phasebelts are offset by Y degrees) – they do not create the design itself. They are not required, but can save time and cost as compared with physical testing.

A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. See *In re Casey*, 370 F.2d

576, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 312 F.2d 937, 939, 136 USPQ 458, 459 (CCPA 1963).

Re: Claim Rejections - 35 USC § 103

17. Upon further review, Examiner has found the Applicants' arguments regarding the previous 35 USC § 103 to be persuasive, and has withdrawn those rejections.

18. New 35 USC § 103 rejections have been applied.

Re: Request for Interview

19. If Applicants are interested in scheduling an interview, they are requested to do so by contacting the Examiner directly.

Miscellaneous

20. Examiner notes that claims 4, 6, and 10 recite a limitation of "adjusting" or "selecting" a "direction of rotation." Neither Perkins nor Gieras expressly teach this limitation, however, Examiner has not found enablement for this limitation in the specification.

Conclusion

21. The following prior art, made of record and not relied upon, is considered pertinent to applicant's disclosure.

22. Jang, G.H. et al. "The Effect of Magnet Geometry on Electric Motor Vibration." IEEE Transactions on Magnetics. June 18-21, 1991. Vol.27, Issue 6, pp.5202-5204. This reference teaches the use of finite-element models to calculate the magnetic forces that generate stator vibrations in motors and generators.

23. Fahimi, B. et al. "Design Considerations of Switched Reluctance Motors: Vibration Control Issues". Conf. Record of the 1999 IEEE 34th IAS Annual Meeting. Oct. 3-7, 1999. Vol.4, pp.2259-2266. This reference teaches the use of finite-element models to calculate the magnetic forces that generate stator vibrations.

Correspondence Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ayal I. Sharon whose telephone number is (571) 272-3714. The examiner can normally be reached on Monday through Thursday, and the first Friday of a biweek, 8:30 am – 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Picard can be reached at (571) 272-3749.

Any response to this office action should be faxed to (571) 273- 8300, or mailed to:

USPTO
P.O. Box 1450
Alexandria, VA 22313-1450

or hand carried to:

USPTO
Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Tech Center 2100 Receptionist, whose telephone number is (571) 272-2100.

Ayal I. Sharon

Art Unit 2123

August 23, 2005

Paul L. Rodriguez 8/25/05

Primary Examiner
Art Unit 2125